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ABSTRACT

This paper focuses on the process of innovation in school systems. It considers the definition of educational innovation, the desired level of innovation, factors leading to the acceptance or rejection of innovations by school systems, and how the acceptance of innovations in school systems differs from that in other social institutions. The authors examine the incentives provided to teachers and principals for implementing innovations once a decision is made to change, how these implementation incentives currently provided by the schools compare with those that might be considered optimal for supporting innovation, and how research could help to test hypotheses about school system incentives for adoption and about individual incentives for implementation. A 14-item bibliography is included. (Author/DN)

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A PROGRAM OF RESEARCH ON

INCENTIVES FOR EDUCATIONAL INNOVATION

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A PROGRAM OF RESEARCH ON INCENTIVES FOR EDUCATIONAL INNOVATION

I. INTRODUCTION

This paper focuses on the following questions:

1. What leads school systems to adopt or reject proposed innovations?
2. How does the behavior of school systems in this respect differ from that of other institutions?
3. Once adoption decisions are made, what incentives do teachers and principals have for implementing the decisions, under various circumstances?
4. How do the implementation incentives that schools now provide compare with those that might be considered optimal for supporting innovation?
5. How can research help to test hypotheses about school system incentives for adoption?
6. How can research help to test hypotheses about individual incentives for implementation?

Before turning to these questions, we discuss two prior issues: the *definition* and the *desirability* of innovation.

People in and out of the schools often appear to define innovation as any new policy, process or organizational change regardless of outcome. This definition is of little operational value, but it reflects two important realities. First, in an "industry" where objectives are both unclear and multidimensional, it is difficult to know how to establish a normative standard for assessing innovations. Second, educational innovations are often not products or technologies, as usually thought of. Even when they are, their application varies widely. Therefore, it is tempting to try to include everything in a single definition. This procedure can be justified on the grounds that a succession of apparently trivial innovations may have cumulative effects.

But this definition is of little value to federal or state policy-makers, who with limited resources to invest must focus on measurably successful changes that result from innovations, even if this preoccupation with "impact" introduces systematic biases into the kinds of changes that receive state or federal support. For these purposes, a successful innovation is one that can show improvements in educational outcomes, improvements in working relationships or processes within the school system (or between the school system and the public), or reductions in costs without reducing significantly the quantity or quality of desired outcomes or processes.* In a competitive economic system, many of these results would come about primarily through market forces.

But because public schools are nonmarket monopolistic organizations, we cannot expect the same results as in competitive industry--both goals and constraints are different. Therefore, the schools cannot be expected to use the same criteria of success as private firms. Schools have their own criteria, which may not always be publicly specified, and which, given the institutional setting, are no less rational than those of private firms. For example, it is important to attract more resources into the system to meet the demands of various constituencies (teachers, administrators, school boards, parents). It is also important not to introduce changes that appear to harm the interests of any major constituency. At the same time society (which includes these constituencies) puts a positive value on "progress" as measured by new technologies and improved outcomes. All these

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*The inclusion of processes in the definition marks an important difference from the economist's definition of innovation, because it implies that the system places value on the process as well as on the outcome. In economic theory, there would be no point to developing new processes or modifying existing ones unless outcomes were thereby improved. But the definition of innovation in education must allow for preferences among processes independent of outcomes. Otherwise, only some allegation of irrationality could explain preferences for more expensive technologies over cheaper ones in the face of widespread evidence that measurable outcomes of schooling are not thereby affected. Those parents who are now aware of such research evidence do not appear to modify their behavior as a consequence.

considerations shape the definition of successful innovation used by those who manage school systems. Their definitions are therefore often somewhat different from those used by state or federal policymakers. For example, an innovation which involves an annual trip to the zoo may seem trivial to the federal policymaker. But if it succeeds in demonstrating to parents that the schools are trying to do something special for children, school administrators may subsequently be in a better position to try out other innovations that the federal policymaker considers more "central" to educational improvement.

In sum, a variety of definitions of successful educational innovation are permissible, since perspectives differ. But for the federal and state policymaker, operating with limited funds in the research and development arena, it seems natural to emphasize a definition which focuses on measurable results in areas that seem of central importance in schooling. This will at times necessarily lead to conflict with local school district perspectives, but this may be an inevitiable price of policymaking in a highly decentralized system with multiple loci of authority.

Our approach to innovation in this paper implies that school systems are not innovative enough. This proposition is often contested, on at least two grounds. First, many educators believe that the combined effect of federal funding for innovative projects and community pressures for change has been to make the schools much more receptive to change than ever before. Second, from a different perspective, many would argue that schools should be a unifying force in society, and that the diversity in methods and curricula implied by encouragement of innovation is undesirable.

We believe that neither of these arguments is convincing. The evidence on implementation of educational innovations indicates that there has been a great deal of movement and publicity in recent years, but not much behavioral change (Berman and McLaughlin, 1973; Fullan, 1972). In particular, it is clear that some districts consistently outpace others with regard to implementation of new educational or managerial practices. Diffusion of innovations has been shown to be generally a much slower process in education than in industry. Some

districts, particularly smaller districts, stay relatively far behind the leading edge of educational reform (Lindeman, et al., 1968). On the issue of social stability, there is little doubt that schooling has an important influence on conformity to cultural norms. But to accept the merits of cultural unity does not require acceptance of the proposition that more diversity is undesirable. Society is much less diverse culturally than it was when contemporary school systems were first shaped at the end of the last century. Meanwhile, the emergence of modern mass media and the growth of the national economy offer ufifying influences that were not even contemplated then. It is probably impossible to define an optimum level of social diversity, but contemporary social trends seem to imply that the argument for homogeneity in schooling is less persuasive than it may have been in an era of mass immigration and greater local or regional isolation.

These arguments for continued emphasis on innovation imply that schools are not now adopting the most effective kinds of innovations and are not providing the most effective incentives for implementation. Sections II and III of this paper discuss these issues. Section IV outlines a program of research on incentives for adoption and implementation.

Studies of political and economic behavior, organizations, social structure and behavioral incentives are the subject of a vast and rich literature in social science. While we draw on this literature in the discussion that follows, it goes without saying that we make no claims either to conceptual completeness or theoretical elegance. Our purpose is to provide some ideas about how government agencies might think about the topics discussed below from the perspectives both of policy and research.

II. INCENTIVES TO ADOPT INNOVATIONS

What leads school systems to adopt or reject different kinds of innovations? How does their behavior in this respect differ from that of other institutions? Some of the characteristics that affect schools' propensities to innovate reflect the market structure of the school

industry. Others reflect the political and social context. These factors in turn influence the character of educational bureaucracy with consequent effects on propensities to innovate. These propensities are themselves powerfully conditioned both by the special nature of educational technology, characterized by unclear methods and uncertain effects, and by the unclear nature of educational goals.

Market Structure

In a market-oriented industry, innovation would be defined as any technology, process, or managerial change that reduced costs or increased sales. Quality improvement, sales engineering and even new product development can be treated as some combination of cost reducing or sales increasing technologies; and in a competitive market, cost reduction would ordinarily lead to sales increases in the short run, and lower prices in the longer run.

But public education is not a competitive industry. It does not have a strong market orientation. It plays a widely recognized and protected social role which makes it the captive servant of a captive clientele. It operates under a highly decentralized bureaucratic system of governance, which is subject to a wide variety of influences, so that each unit perceives itself as facing a unique configuration of clients and masters. And it is subject to much public scrutiny as to quality, equity, and goals.

In its market structure, public education is operated by school districts as a local monopoly with special characteristics including:

1. Aims that are unclear;
2. Technology that is unclear, in the sense that it often does not travel well between schools and districts or over time;
3. Little incentive to be economically competitive--gaining pupils from other districts or private schools is not necessarily perceived as advantageous;
4. Its "products"--education and socialization--are only partly provided by the public schools, and mostly provided by other

influences, such as heredity, family, peer-group environment, and communications media;

so that it is difficult to gauge the effects of schooling.

The public schools also have a good deal in common with other non-market public utilities (such as police, fire, public health services), in that all are largely self-perpetuating bureaucracies and highly labor-intensive industries, which implies low rates of productivity growth compared to more capital-intensive sectors of the economy.

Political and Social Structure

The public schools are basically conservative social institutions, for they are the principal governmental agency charged with transmitting society's values and store of knowledge from generation to generation.

A dominant element in American education has been the effort to bring greater social and cultural homogeneity to a nation of immigrants. This has meant in practice that the schools have served to inculcate both the standards of American industrial civilization, which has strong links to the so-called Protestant ethic, and American political culture, which is strongly democratic and individualistic. The political tradition of individual independence from central government control has been one important basis for the jealously held independence of local education agencies. In practice, the nation's 17,000 school districts are largely independent from state control, and almost wholly independent of federal control. This has led to a tradition of autonomy in which each district is beholden only to its own citizens, and is under no great pressure to follow the model of others. Despite these forces making for diversity, however, common elements are very strong. The major forces working in this direction have been state certification practices, college entrance requirements, informal influence networks of school superintendents and schools of education, and the nature of the perceived needs for appropriate socialization and training.

Another reason for relative homogeneity in the face of so much diversity is the political setting, which places sharp constraints,

varying from district to district, on the freedom to tap existing incentives or encourage new ones. Normally, a country's educational system reflects a balance of social and political forces, some supporting an earlier or existing status quo, others advocating changes that range from moderate or idiosyncratic to revolutionary. In general, at most times and places, parents say that they believe that the schools are doing a good job. Those pressure groups that seek change not only face the enormous inertia of established social practice, but also face equal and opposite forces pushing for other kinds of changes.

The political and social atmosphere, of course, is itself subject to change. The population composition of a school attendance area or district may change, popular perceptions of student performance and school quality may change, courts may require school desegregation, and so on. These changes may lead to a new political balance which for a time encourages innovation. But at the same time the public prefers that the schools be isolated from "politics." The values which the schools transmit and the important role that schools play in children's lives contribute to a strong and perennial public viewpoint that the schools should be independent of political interference. Therefore there are always forces at work tending to counteract politically motivated forces aimed at bringing about change in the schools.

Effects on the Bureaucratic System

The consequences of market factors and social/political factors on the educational bureaucracy may be summarized as follows:

1. The system is highly decentralized, with a great deal of autonomy from political interference in setting instructional policies. The tenure system for teachers reinforces that independence.

2. Yet, because it is so close to important values of society and the family, it cannot afford to innovate too boldly.

3. The schools' monopoly status means that the system will usually survive criticism and attacks more or less unscathed, because the public has no real alternatives.

4. Because technology is unclear, there is a premium on trying out only small changes from the status quo--there is little assurance that any change that has worked well in one place will work well in another, and large changes are risky.

In sum, the schools are, as a consequence of these market, social, and political forces, rather peculiar institutions. They are free to act independently in a wide domain under the cloak of professionalism. Yet the nature of the market and of the social and political context tends to shape their incentives toward a high degree of risk avoidance.

Incentives and Market Structure

We suggest the following hypotheses about the relationship of educational market structure to incentive to adopt innovations.* Compared to a competitive firm, we would expect the public schools to:

H1. Be *more likely than the competitive firm to adopt cost-raising innovations*, since there is no marketplace to test the value of the innovation (e.g., smaller class size) in relation to its cost. Therefore, any cost-raising innovation that is congenial to the public school authorities and acceptable to local taxpayers or state and federal funding sources will be adopted.

H2. Be *less likely than the competitive firm to adopt cost-reducing innovations*, unless the funds so saved become available for other purposes within the district.

H3. Be *less likely than the competitive firm to adopt innovations that significantly change the resource mix* (e.g., a higher ratio of teacher aides to teachers, sharply increased use of capital-intensive technologies), because any consequent productivity increases are not necessarily matched by greater "profits" to the district,

*The following list is taken from Pincus (1973), pp. 6-7.

and because any replacement of labor by capital may threaten the guild structure of the schools.

H4. Be *more likely than the competitive firm to adopt new instructional processes or new wrinkles in administrative management* that do not significantly change institutional structure, because such innovations help to satisfy the demands of the public, of state and federal governments, and of teachers and principals themselves for change and progress without exacting heavy costs to the district in the form of organizational stress.

H5. Be *less likely than the competitive firm to adopt innovations that change the accustomed authority roles* and established ways of doing business, because changes in these relations represent the heaviest kind of real cost to bureaucracies.

From this perspective, the public schools can be seen as more likely than private firms to adopt innovations that do not require complex changes in management structure or organizational relations. Such innovations help to satisfy staff and client demands for change, without requiring from the organization the difficult task of self-renewal, which many of the organization's clients, as well as the organization itself, might resist. These considerations point to an additional hypothesis:

H6. The creation of a more competitive condition in the schooling "market" is likely to create greater diversity of approaches to schooling than would otherwise occur in the relatively monopolistic market conditions of the public schools today.

Incentives and Bureaucracy

Bureaucratic and market structure considerations point in the same direction in influencing the types of innovations that school systems adopt. We suggest the following hypotheses:

H7. Innovations are more likely to be tried when they are perceived as favorable or neutral with respect to the safety of the bureaucracy.

H8. Innovations are more likely to be tried when external pressures on the bureaucracy are perceived as irresistible.

H9. Approval or consensus of peers and peer elites makes it more likely that a decisionmaker will accept the risks associated with changing his behavior.

The bureaucratic safety constraint implies a reluctance to accept radical changes. The fear of external pressure means that schools will be reluctant to enter into genuine collaboration with community and student groups, because of the possible consequent pressures for accountability and reform. The elite consensus constraint tends to encourage only modest departures from current practice.

Given these constraints, schools tend to adopt innovations which demonstrate that schools are "up to date," "efficient," "professional," or "responsive," in the sense that innovations are chosen to impress the relevant clientele with the appearance of change without requiring major changes in organizational behavior or structure.

Because there are more than 17,000 school districts, each with a somewhat different clientele, we would expect the adoption of innovations to be a selective and idiosyncratic process, reflecting the diversity of social goals and attitudes both within and outside of the school system. The following additional hypotheses, not directly testable in the research proposed below, may be appropriate for possible future research.

Innovations seem to be more widely adopted:

H10. If they are based on carefully planned research and development, particularly those receiving the support of professional educator groups;

H11. If the users of the innovation (teachers, administrators, students) perceive the innovation as meeting their objectives;

H12. If the innovation is not too complex for the schools' capacities (as measured by wealth, available time and energy, training, experience, management's authority to support change);

H13. If the results of the innovation are easy to observe and communicate;

H14. If the innovation appears to require technological change rather than behavioral and organizational change;

H15. If the research and development community is able to understand the dynamics of public school decisionmaking and works closely with the schools.

The Role of Technology

All of these incentives are powerfully influenced by the nature of educational technology. Technological possibilities circumscribe the limits of innovation at any one time. Educational technologies are generally not events (or gadgets) but knowledge about processes requiring changes in the behavior and roles of many people. It seems safe to assert that availabe technology is largely confined to innovations that do not require such changes in behavior and roles, in other words those that are "up-to-date," "efficient," "professional," or "responsive" without major effects on professional staff. Naturally, with the passage of time, the growth of research and development efforts, and attempts to improve the dissemination of R&D findings, technological horizons do expand (e.g., the potential of cable television or computers) a wider variety of professional skills may become available (e.g., the effects of the Education Professions Development Act in increasing the number of skilled specialist teachers), or new and carefully planned curricula are developed (e.g., new math, PSSC physics), so that the picture is never static. But because educational technology is a process which varies substantially with the context where it is conducted, it is much harder in education than in industry to adopt a new technology with confidence. The risk calculus associated with adoption is less favorable than in industry. Unclear

technology makes it difficult to predict the results of innovation. Unclear goals make it difficult to assess the results that actually do occur.

Incentives to Adopt Innovations: Conclusions

A number of methods for classifying innovation have been suggested (see Havelock, 1969). One approach is to classify innovations by effects on resource use and system organization, according to the following typology:

- o Changes that increase or decrease the level of resource use only.
- o Changes that affect the resource mix.
- o Changes in instructional processes or methods that do not significantly change the resource level or mix.
- o Changes in administrative management that do not significantly affect the organization's power structure.
- o Changes that affect either the organizational power structure or relations to external authority.

In general, the market structure of the industry, the social/political context, and the bureaucratic structure lead to the conclusion that schools would be most likely to adopt those innovations that increase the level of resource use, those that do not affect resource level or mix, and those that do not significantly affect organizational power structure. Other innovations--those that significantly change resource mix, decrease levels of resource use, or affect organizational power relations--are less likely to be adopted.

It is possible to appeal to incentives directly or through operating on the environment. Direct appeals to educators' incentives normally focus on personal beliefs, particularly those associated with professionalism, or on opportunities to gain status--the chance to be a "light-house" district, school or educator. Direct appeals to innovate based on threat or reward (such as merit pay) have also been attempted (see Section III), but are often stigmatized as unprofessional.

Attempts to change the environment aim at bureaucracies by providing organizational slack in the form of extra federal or state resources, or at the political setting as in the case of school desegregation or the community control movement. The development of a substantial federally sponsored research and development system attempts to modify the technological environment. But this effort tends to use a research and development model of change that is generally inappropriate for bringing about innovation in the schools, because it ignores the behavioral factors surrounding adoption and implementation. Finally, efforts to change the market environment of the schools have been limited to scattered experiments such as performance contracting, the Alum Rock voucher trial, and the rather spotty development of free schools and alternative schools.

In general, it does seem likely that federal leverage would be greatest in attempts to affect the environment that schools operate in, rather than through attempts to operate directly on individual incentives. In such a large and highly decentralized social system as that of the public schools, it is difficult to provide finely-tuned incentives that are appropriate to the myriad circumstances encountered in thousand of school districts. It may be somewhat easier, using cruder tools, to redefine the boundaries that circumscribe individual and institutional behavior, allowing each school and district to follow the incentives thereby released or created. However, this is only a general presumption, and it may often be valuable for research and development policy to appeal directly to incentives for reward, recognition, or personal (intellectual or normative) satisfaction.

In the following section, we take up the topic of individual incentives to implement innovations.

III. INDIVIDUAL INCENTIVES AND THE IMPLEMENTATION OF INNOVATIONS

In Section II of this paper we discussed the consequences of market, social/political, and bureaucratic forces for decisions to adopt innovations. Here we take up the subject of postadoption behavior--implementation--from the perspective of individual incentives. Once adoption decisions are make, what incentives do teachers and principals have for implementing the decisions, under various circumstances? How do the implementation incentives that schools now provide compare with those that might be considered optimal for supporting innovations?

We begin with some necessary *simplifying assumptions:*

- Incentives apply with equal force to different people in the same situation. In reality the effect of incentives depend on the underlying motivations they tap (McCelland, 1971), but these motives are idiosyncratic and not readily subject to policy influence (and probably should not be). We ignore motivational states in the discussion that follows.
- There are no important interinstitutional variations. In reality schooling situations will vary gratly from place to place, and some schools and school districts may be quite different from those discussed here.
- Incentives are conditions or arrangements that are clearly bounded and distinguishable one from another, as well as from motivational dispositions. In reality, definitional problems make this assumption a simplistic one, though it may be necessary for purposes of discussion.

Our concern is with the incentives of teachers and principals to *implement* important innovations once they have been adopted in principle. We assume that the implementation process for significant innovations requires important behavioral and role changes for both teachers and principals, and that these changes will be perceived to involve some risk (Fullan, 1972). We treat incentives as characteristics of the environment that induce people to act in a variety of situations (McClelland, 1971). Following this definition, for example, a person

might be motivated to acquire more money; his incentive to work harder would be the existence of potential material reward tied to his work behavior.*

We begin by specifying a list of incentives commonly held to be important determinants of behavior. There are always many candidate items for such a list, and many possible ways in which to organize such items. Arguments over the definition of terms in such an exercise can also consume volumes. But it is not clear that such arguments would lead to any significant alteration of our conclusions, and the incentives listed below may provide at least one helpful way of approaching a difficult and important conceptual problem:

- Material reward
- Challenge
- Fate Control
- Influence
- Understanding
- Role demands
- Opportunities to pursue beliefs
- Status
- Power
- Opportunities for affiliation
- Change
- Threat

We take up each of these incentives in turn, with a brief discussion of how each may relate to selected organizational, bureaucratic, technological and market characteristics of education from the point

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*In the event that implementation of a particular innovation does *not* require important behavioral changes, then one of two conditions may obtain: (1) the innovation is trivial; (2) the innovation has been designed to take advantage of the existing motivational and organizational structure. There is no substantial body of evidence to indicate the relative frequency of these "painless" innovations, nor, in particular, the occurrence of *significant* innovations that do not require important changes in behavior.

of view of teachers and principals. We then draw on this analysis to propose a number of broad hypotheses about the relationship of key elements of educational organization, bureaucracy, technology and market structure to individual incentives to implement innovations. The last section of this paper describes a number of research and experimental projects designed to test hypotheses we put forward.

Material Rewards. Few doubt the motivating power in our society of material reward--money income or its equivalent. For teachers and principals, predictable incremental increases in material reward are tied to the completion of additional units of formal education, and seniority--perseverance--rather than to performance. (In part, this is because performance criteria are vague in education, but at the same time, relatively little effort has been made to explore criteria according to which special material reward could be offered.) The security of a *stable* and *predictable* reward system may well be more important than any gross salary increase would be as an incentive to implement innovations, since this system serves to minimize one potentially important consequence of "failure"--loss of income. At the same time, the penalties for *avoiding* change are equally minimized, so that material rewards as they are now offered do not seem on balance to be a particularly powerful incentive.

This illuminates an important aspect of material reward as a potential incentive--that it must almost always be directly tied to the behavior desired in order to be fully effective. If this proposition is correct, teacher and administrator salaries could be doubled or tripled without securing an appreciable increase in their propensity to accept the risks of beahvioral change, *as long as the salary increase were not related to the behavior in question*, but reflected the uniform reward structure now relied upon as a guarantee of fairness. This suggests the possibility that the most effective use of material reward incentives might be the creation of a highly differentiated *incremental* reward system, built on a basic structure that provided both security and predictability, in which opportunities to secure *additional* income were tied directly to "effectiveness" criteria,

including willingness and capacity to implement significant innovations.

For the principal, whose income and perquisites are considerably greater than those of the average teacher in his school, another perspective may exist: On the one hand, he is usually more vulnerable to administrative sanction, including removal from office and loss of income, than are his teachers, and his incentives here should pull him in the direction of demonstrating his administrative competence, his "up-to-dateness" and his professionalism. These are incentives which push in the direction of moderate risk taking, and could be expected to be salutory for the implementation of innovations in his school. On the other hand, if he seeks a significant increase in material rewards, he must aspire to a higher administrative position, and in order to maximize his chances for promotion he may attempt to acquire a reputation as a competent and moderate professional who is willing to take modest risks but who has enough sense not to go out on a limb. Since the definition of "modest" risk taking will require the exercise of individual judgment, a principal who seeks higher administrative position may well be inclined to follow closely the views of those upon whom he depends for promotion. Unless district administrators are themselves "risk takers" (but cf. the discussion in Section II, above), the principal whose ambition is motivated by the desire for increased material reward is not likely to be much of a risk taker, either.

The average school system cannot at present offer significant increases in material rewards to teachers or principals, either uniformly or incrementally on a selective basis. There are two main reasons for this:

1. The schools have little incentive to offer differentiated rewards and teachers have little incentive to make such a demand, because in a public monopoly, salary need not be related to being "good" or "exciting" because these attributes are in turn not related to attracting students, and attracting students is not related to staying in business.

2. The schools cannot afford any significant increase in material reward for professionals because they rely on fully-paid professionals for all tasks, and resist the use of volunteers, paraprofessionals, and student tutors, except as *additions* to--not replacements for--existing staff. The present organization of schools makes it difficult to change this pattern. For example, inexpensive student tutors cannot be used if older and younger students are segregated into different physical plants, and it is hard to find ways in which to utilize less expensive personnel as long as the central organizational device for the transmission of knowledge is the 30-student classroom in the charge of a single adult.

Challenge. Motivational research has shown the importance of moderately difficult tasks, especially for people who are high in achievement motivation. Apparently tasks that are neither too easy nor too difficult are those that invite the greatest effort. In education, however, technological uncertainties make it hard to know how difficult any given task may be if it has not been tried before. An enthusiastic administrator, or an effective salesman whose product may be part of the new activity, can raise the expectations of teachers and principals about both the potential payoff in educational productivity and the relative ease of implementation. Later, uncertainties about how actually to implement the innovation may make the task look much harder than anticipated, at which point the teacher and/or the principal may be motivated to retreat to the safety of familiar behavior and familiar role patterns.* The present organization of the schools puts teachers, in particular, under great pressure because they must fill widely varying professional roles as teacher, evaluator, counselor,

*Underestimation of a project's difficulty may also serve to induce professionals to tackle a job they would otherwise not take on, and after they realize the true difficulty they face they may rise to the occasion with new and inventive solutions (see Hirschman, 1967).

and responder to community demands. Commitments to a lock-step curriculum and the organization of students by grade levels assigned on the basis of chronological age, and in clusters of 30 in a specific enclosed space, place further limits on the ways in which any single teacher can modify his or her behavior. Three things in particular are missing: (1) *time* as a resource for flexibility, adaptability to new demands and experimentation; (2) a reliable source of professional assistance on site in case of difficulty (everyone is a generalist); (3) physical space that can be arranged to support special needs. For the average teacher the problem is both technical and psychological--a problem in which "overload" in both senses of the word precludes the active consideration of new behavioral patterns. Teachers may also be influenced by predictions they make based on their understanding of "history"--their sense of whether previous attempts to implement significant innovations were either "successes" or"failures." The combination of these influences often serves for any given innovation to put too much at stake, to turn the challenge of a moderately difficult task into one that is loaded with potential consequences. Such a task may then be viewed as one of great difficulty that is not worth the risk. Thus a combination of technological and organizational problems can subvert the very important incentive of providing a challenge to professionals centered around a task that appears feasible and is neither too easy nor too difficult.

Fate Control. The opportunity to obtain or improve control over one's own fate is a powerful incentive in most social circumstances. Many people are willing to make serious efforts for a chance to acquire additional freedom to make choices in areas affecting their own interests and destinies. In education, centralized bureaucracy and hierarchical management remove many chances that teachers or principals may have for a feeling of fate control. Authoritarian, noncollegial decisionmaking styles may give them a sense of being moved around as passive objects rather than being treated as active participants. This may make them unwilling to cooperate in an endeavor that has been mandated from above. In part, this is a consequence of management styles in large, formal

organizations. (Argyris, 1957, 1964). It is also a consequence of the need to remove and insulate professiona' control from the political process. This need provides much of the thrust of strong central management, which can provide uniformity, predictability, and ease of control over widely dispersed centers of activity. These management objectives in education are pursued both as prophylaxis against charges from clients of uneven or unfair administration of education, and to facilitate management's response to such charges in a highly decentralized setting where administrators cannot be conversant with operational details. The generally poor track record of educational administrators in bringing parents and community into a cooperative relationship with the schools--especially in poor communities--reinforces adversary relationships between schools and communities. The result is to place a premium on tight management control of one's own area of responsibility. Where teachers or principals have attempted on their own to become more responsive to school community problems and thereby to provide themselves with an atmosphere where more flexibility of decisionmaking might be possible, reaction at higher levels of the educational bureaucracy has often been hostile.

Influence. People need to feel a sense of efficacy--the feeling that their work and efforts have had a real impact, have counted for something and have affected some desired outcome. One implication of this incentive is that researchers and administrators should pick innovative projects that are likely to work in light of sufficiently broad success criteria, in order to build success experiences in the schools. At present, the "success history" of a school is not often taken explicitly into account in considering the level of innovative ambition that should be encouraged. This may suggest one reason for teachers moving to "better" schools and reveal in part why teachers choose to work at private schools, often for lower salaries. Opportunities for teachers or principals to increase their present sense of influence over educational outcomes might offer them a strong incentive to take risks associated with the implementation of innovative

projects. However, these opportunities are now restricted by a system that keeps the successful teacher in her own classroom and largely abjures the notions of middle management and differentiation of teacher tasks. Few teachers are allowed to add responsibilities beyond their own classrooms, and few principals are permitted to extend their influence or authority beyond their own school. This would naturally affect the rate and success of the diffusion of successful projects.

Understanding. A wide range of cognitive incentives are important, including the incentive to know the way things work, curiosity, and the drive to cognitive consistency. Where technology is uncertain and specifications for behavioral change are vague, professionals may predict that attempts to understand what is needed and how to get things done will lead only to frustration. As one student of the subject has put it, "[for man], the awareness of the potentiality for error tends to create a basic posture of uncertainty and self-doubt and a predisposition to constant inquiry into the accuracy of his perception of his world." (Argyris, 1964; see also Brewer, 1972). In addition, there are generally few resources to which teachers and principals can turn for assistance. The world of educational information resources is complex and confusing, and access is limited and not widely visible (Weiler, 1973). However, many psychologists believe that the drive to make one's own understanding consistent with reality often leads to the substitution of other people's perceptions of social reality as a referent for one's own views. In the absence of one's own clear understanding, what others think provides a subjective feeling of correctness. In organizations, opinion leaders may perform some of this function--and in the schools, opinion leaders for teachers would tend to be colleagues chosen on the basis of subjective as well as objective criteria. But in education, there is little or no provision for the explicit selection, training, support, or recognition of teachers or principals in this role. There is no attempt to develop opinion leaders who could help to minimize the frustration of colleagues who might otherwise wish to change behavior,

but who will resist change in the absence of opportunities to feel that the problem they face is well understood. Pulling in the opposite direction is a related aspect of the cognitive incentive--the drive for dissonance reduction. Here, once teachers or principals embark upon programs about which they had doubts, they are likely--according to this theory--to modify their opinions of the program in order to make those opinions more consistent with their behavior.

Role Demands. All social roles have behavioral demands associated with them. Teachers and principals are expected to demonstrate "professionalism," "fairness and objectivity," and--most important from the perspective of this discussion--high motivations for renewal, improvement, and effort on behalf of children. A number of studies have pointed out, however, that teacher groups, administrators, and community groups may have very different role expectations for teachers and principals (Backman and Secord, 1968; Foskett, 1969). This absence of consensus may have the effect of diluting and distorting this incentive, of introducing conflicting and disorienting signals--or what is sometimes called "role strain." The management of education places relatively little emphasis on attempting to formalize consensus or expectations between teachers and communities or between principals and communities, which contributes to this problem. The bureaucratic pattern--in which administrators are largely recruited from among teachers who are not trained in the arts and sciences, and where intermediate combined teaching/management roles are largely missing--contributes on the other hand to role consensus problems between teachers and administrators. Technological uncertainties only heighten these feelings of ambivalence and conflict.

Opportunities to Pursue Beliefs. The opportunity to pursue deeply held beliefs and values has always been a powerful incentive. The schools provide an environment in which teachers and administrators may pursue a number of important beliefs and ideals about the way in which children should be treated and taught, but the need of the educational bureaucracy for predictability and uniformity inevitably

impedes important individual deviations, and prevents the average teacher or principal from trying out new approaches or emphasizing unusual goals. Thus the potentially creative and inventive teacher or administrator must ordinarily share the major premises of the dominant local consensus on ends and means in education, or suffer frustration--as many reportedly do. The accompanying tensions are heightened by the absence of a clear consensus among all social groups on the hierarchy of educational goals. The existing bureaucracy is often able to exploit this situation, if it desires, in order to enforce its own views, which may differ in important respects from those of some parents, students, and teachers. No doubt there is a good argument to be made for a system which does not allow frivolous educational experimentation, but it has been argued that the price paid in rigidity and the stifling of personal initiative is higher than necessary. There are two related consequences of the centralization of authority and the enforcement of relatively uniform procedures: (1) Teachers and administrators may realize that with operationally vague innovations there will be unpredictable contingencies that will not yield to "packaged" solutions. Their experience with the system may lead them to predict low tolerance for homegrown and possibly unorthodox solutions to these contingencies. They may therefore assess the risks of attempting to implement the innovation as unacceptably high, and either balk at participation or indulge in a form of "sabotage," making no serious attempt to change roles or behavior but paying lip service to innovation. (2) Belief systems in our political culture include the widely and strongly held belief in the morality and efficiency of participative decision-making processes. Arbitrary or unilateral imposition of an innovation "from the top down," may do violence to these beliefs. In such a situation, teachers and principals may resist providing the necessary cooperation for successful implementation, either as a matter of principle or as a means of pressing their case for participation.

Status. The drive for esteem is a universally recognized incentive to take risks and work hard. Recognition, prestige, and status--correlates of and paths to esteem--are in various guises an important part of the incentives offered by all organizations. It is perhaps a commonplace that one of the attractions of teaching had long been the presumption of esteem in which the teacher was held--his or her status in the community. It is commonly argued that this status was at least in part some important compensation for unusually low salaries. This perception, whatever its accuracy, reflects the importance that is widely attached to professional positions of high status. The corollary observation today is usually that this state of affairs has now been seriously eroded or ended--a victim of changing times and modern social tensions. Whatever the case, it may be observed that the drive for material reward by teachers over the last decade has largely altered the salary picture, and we can only speculate whether this trend is related as cause, consequence, or coincidence to the apparent parallel diminution of teacher status. It is also the case that status and recognition are not heavily relied on as incentives for teachers and hardly more so for principals. One reads occasionally of "teacher-of-the-year awards," but these ceremonies only highlight the general absence of a highly differentiated formal status system in education. Nor is much attention paid to the issue of status for teachers as a professional class. Consider the ordinary trappings of professional status in a university or research organization--private space, time for contemplation, flexible workload, personnel and material support. Teachers have none of these professional perquisites and principals have them only to a limited degree. In most organizations, high salaries are also a symbol of status, but despite recent improvements teachers are not well paid by professional standards.

There appear to be a number of reasons for these difficulties in establishing status:

1. With uncertain technologies the criteria for the recognition of excellence are difficult to specify and open to challenge in their

selection and their application.

2. Schools are organizationally more like a manufacturing industry than a profession. In large cities in particular, the mass of teachers and the flow of children is so great that the schools tend to take on the appearance of factories, in which raw materials (kindergarteners or first graders) come in, are processed, and emerge as finished products (graduates) some 12 years later. This analogy may be somewhat harsh--it certainly ignores the reality of the effort made by teachers and administrators alike to meet the individual human needs of thousands of children--but from the management perspective of a centralized educational bureaucracy, the mass production aspects are often the most salient.

3. There may be considerable continuing reliance on community and society for the provision of esteem to educators as an important class of professionals, and a consequent relaxation of attempts to provide esteem within the structure of the system itself.

4. The system promotes and reinforces social distances between teachers and administrators that could be breached by more concentrated efforts to raise status generally or to single out professional excellence for special esteem.

5. The system is overwhelmingly dominated by male administrators managing female teachers. There is considerable suspicion and anecdotal evidence that differences in sex role perceptions play an important role in administrator indifference to teacher status.*

6. Resource scarcities preclude reliance on status perquisites of the kind commonly used elsewhere.

Power. The opportunity to influence or control the behavior of others is one of the best known incentives for human ambition. Power is exercised and sought in widely different ways in different cultural, institutional, and organizational settings, and is often

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*Phi Delta Kappa, a national professional education fraternity, does not admit women and has recently removed several local chapters which chose to violate this rule.

sought "for its own sake," as a safeguard against the influence of others and a means of preserving independence of action and control over one's destiny. Thus it is related in important ways to concepts we have discussed above such as fate control and influence. It is related as well to our discussion of beliefs and values, wherein we touched on the importance of providing teachers and principals with the organizational and technological instruments required for the implementation of their ideas. This too is in part a question of power, viewed broadly as the ability to influence outcomes.

To the extent that opportunities to acquire power are an incentive for teachers and principals to modify their traditional behavior and accept new role demands, this incentive may be counterproductive in the present educational system. The paths to power in most school districts are guarded, as in any organization, by those who benefit from existing arrangements, and who extract conformity to these arrangements as the price of successful ambition.* But these arrangements play an important role in stifling numerous possible incentives to implement innovative programs, and reinforce impediments to flexibility and inventiveness at the school and classroom levels. (For a related point, see the discussion of incentives for material rewards, pp. 16-18, above.)

Under these circumstances, it would seem wiser not to rely on power incentives but to concentrate on ways in which to make other incentives more salient, for example by devising policies and strategies to alter organizational and administrative arrangements, and technological uncertainties, that now impede attempts to utilize other incentives more effectively.

Opportunities for Affiliation. The opportunity to join with others in pursuit of shared goals is a strong incentive related to the need to feel a sense of purpose and meaning for one's efforts.

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*Many experiments and innovations are treated with hostility by school administrators because they are seen as a threat to their prerogatives and raise the spectre of a loss of administrative control. Arguments over attempts at school decentralization in recent years have largely been arguments over where power shall reside, and in what forms.

The present organization of schools provides little opportunity for this incentive to motivate behavior. Teachers and principals live comparatively isolated professional lives, with few formal opportunities for the development of strong and lasting group affiliations based on shared purposes and a division of labor. Teachers are organized on a grade level basis, and within grade levels are isolated in their classrooms. They may confer informally with their colleagues in the school lunchroom, or launch a limited cooperative effort as part of an attempted innovation such as team-teaching, but essentially their isolation is rarely breached.* Indeed, the picture that comes most readily to mind when discussing teacher cooperation in pursuit of shared goals is teacher union activity outside the schools, rather than teaching activity inside.

Principals are isolated as well; they confer with colleagues and other administrators but rarely have an opportunity to collaborate in a joint venture.** Furthermore, to the extent that they endorse (or are required to endorse) the bureaucratic style of centralized and hierarchical decision-making, they maintain a distance from teachers which does not permit collegial affiliation within their own schools. Affiliative incentives are for these reasons not yet powerful stimulants to behavioral change in most school settings.

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*One ongoing experiment that shows signs of changing this pattern is the voucher demonstration in Alum Rock, California, where teachers in each school are organized into smaller cooperative units called "mini-schools," each with a unifying theme, which cut across grade-level distinctions and (in principle) compete with one another for the achievement of excellence and attractiveness to students and parents.

**In the voucher demonstration, two principals proposed a collaborative effort in which they would jointly manage their two elementary schools and a new junior high school, thus creating a new educational complex. The proposal was perceived by some of their colleagues as too unorthodox and ambitious, and was ultimately rejected by district authorities. At the same time, a powerful group ethic may be growing among the first principals to volunteer for participation in the demonstration, based in part on a sense of shared risk.

Change. We suspect that one of the stronger incentives at work today in persuading teachers and administrators to attempt the implementation of innovations is the simple desire to escape from boredom and routine. The common human need for stimulation and change probably applies as well in the schools. But if innovations are attempted largely because they are "new," without adequate preparation, realistic expectations of the demands that will be made on participants, or strong supporting incentives, disillusionment and retreat may follow, together with a conservative reaction toward change that may sour future attempts. This suggests that discretion be exercised in "selling" innovations to schools, for if they are sold on the basis of newness and excitement without also making sure that the schools are "ready" for them--technically, organizationally, and psychologically --the long-run result may be counterproductive. The unthinking promotion of innovation as an end in itself is probably self-defeating.*

This incentive has another implication: Where a generalized sense of excitement exists, say on the basis of participation in a complex and difficult new project, a "charged atmosphere" is sometimes created, in which the willingness to take unusual risks or work unusually hard is accentuated, and which consequently creates a fertile environment for unorthodox approaches to education which otherwise have difficulty finding a location for testing. It may occasionally pay to try to create such an environment for short periods of time--to appeal to incentives to seek new stimuli--precisely in order to reap such benefits.

Finally, we might speculate that a sense of excitment provides emotional and psychological returns that lower the drive for material reward. Strong drives for material improvement may be positively associated with routine, dullness, and boredom, in part because these problems may be perceived as a burden that makes an increase in material reward justified, and in part because a focus on increasing material

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*People seek stability as well as change. "Too much" excitement over an extended period of time may result in efforts to restore a sense of calm and equilibrium, with opposition to additional changes. This also argues in favor of selectivity in the adoption of innovative projects, and against the support of "change for the sake of change."

income may itself serve as a means to break monotony and create controversy.

Threat. Where the loss of existing rewards is possible in the absence of demonstrated professional improvement, powerful behavioral incentives may be created (consider the case of the assistant professor who must put in two or three times as much work as the full professor simply in order to earn his tenure and maintain or improve his present position). For the most part, as we have noted, the schools' reliance on nonmerit criteria for the award of tenure or promotion, plus the emphasis on security and stability of income, removes this incentive as a meaningful alternative short of a radical restructuring of education to introduce competitive market features. However, reforms aimed at introducing incremental rewards on the basis of merit, and at differentiation among teachers on a merit basis in the assignment of authority and the distribution of status symbols, may tap this incentive in a different way. Perceptions of threat include predictions of future relative deprivation within one's reference group, and such predictions may stimulate behavioral change designed to foreclose such possibilities. In the military, for example, it is possible to achieve and maintain middle rank simply through perseverance and the avoidance of gross mistakes, but promotions beyond this rank--which one may predict for one's colleagues--will require some effort to demonstrate special merit. It is the threat of future relative deprivation in this environment which largely explains the otherwise unaccountable eagerness of junior officers to seek combat--where survival without blemish to one's record is recognized as a path to merit-based promotion.

Hypotheses

Drawing on the preceding analysis, we identify below a number of hypotheses about the relationship of key organizational, administrative, technological and market factors to incentives felt by teachers and principals to make serious efforts to implement important innovations.

Incentives and the Organization of Education

We have noted the following characteristics of the organization of education:

- o Reliance on fully credentialed professionals for all tasks.
- o Segregation of students by age group into different physical facilities.
- o No differentiation of professional tasks (teaching, evaluation, counseling, community liaison).
- o Lock-step curricula.
- o The absence of free time.
- o Organization of students by grade level on the basis of chronological age.
- o The clustering of 30 or more students in an enclosed space for the transmission of information by a single adult.
- o Inflexible physical space.
- o No school site access to special professional assistance with difficult problems.
- o Restricted access to information resources outside the school.
- o The organization of teachers on a grade-level basis.
- o Teacher isolation in classrooms.
- o Principal isolation in school buildings.

The following hypotheses are suggested:*

H16. The reliance on fully credentialed professionals for all tasks sharply reduces the ability to offer improved *material rewards* or *status perquisites*, by forcing the commitment of most existing resources to the maintenance of professional salaries. In addition, the segregation of students by age group into different physical facilities, and reliance on a single adult to transmit knowledge to large groups of students, makes it difficult or impossible to reduce

*The hypotheses presented below are numbered consecutively with those presented in Section II, above, for ease of reference.

costs by using student tutors or other less expensive personnel as a potential source of assistance.

H17. The non-differentiation of professional tasks, absence of free time, and clustering of students in groups of 30, places teachers and principals under personal pressures that diminish their ability to find the necessary time and energy to *understand* their environment and the character of new demands that may be made on them. Increased *understanding* is also impeded by the absence of school site access to special professional assistance, and restricted access to information resources outside the school.

H18. In part because they affect requirements for achieving understanding, and in part because they independently constitute built-in structural and process-related obstacles to the modification of behavior, the organizational characteristics noted in *Hypothesis 2*, above, also weaken teachers' and principals' sense of being able to *affect their own interests, break with routine, influence educational outcomes,* and successfully *pursue their beliefs.* Additional organizational characteristics that contribute to a mutually supportive set of obstacles to the application of these incentives include: segregation of students by age group into different physical facilities, grade level organization by age, lock-step curricula, and inflexible physical space.

H19. The organizational characteristics discussed in *Hypotheses 2 and 3*, above, because they both impede chances for improving understanding, and consitutute a set of interlocking obstacles to the successful modification of existing practice, make significant behavioral change appear to be a task that exceeds the moderate degree of difficulty necessary to *challenge* teachers and principals who are high in achievement motivation.

H20. The organization of teachers on a grade level basis, teacher isolation in classrooms, and principal isolation in school buildings offer poor *affiliation* and *change* incentives by limiting opportunities to develop strong group loyalties based on the pursuit of shared goals, and restricting opportunities to break with routine.

Incentives and the Administration of Education

We have discussed a number of characteristics of administration and bureaucracy in education:

- o Material rewards tied to seniority and formal educational levels.
- o Relative uniformity of material reward as a guarantee of fairness.
- o Hierarchical organizational and decisionmaking patterns.
- o Emphasis on strong central management to provide ease of control and uniformity of administrative practice.
- o No middle management or mixed teacher/administrator roles.
- o No training or support of selected teachers and principals on the basis of merit.
- o Administrator recruitment from among male teachers who often do not have an arts and sciences background.

The following hypotheses are suggested:

H21. The tying of salary structure to seniority and formal educational levels, and reliance on relative uniformity of salaries as a guarantee of fairness, reduce the utility of *material reward* or the *threat* of future relative deprivation as incentives. These incentives are reduced for both teachers and principals because basic material rewards are not distributed on the on the basis of merit or effort, and incremental reward systems based on these criteria are largely discouraged. In addition, the salary structure for principals has a relatively narrow range, and a relatively heavy stress on seniority, so that promotion to higher administrative position is the major means of securing a substantial improvement in income. A principal who seeks such promotion, however, may feel required to endorse the views and policies of senior administrators, who may support arrangements which help to stifle incentives to implement innovations.

H22. The hierarchical nature of educational bureaucracy and decisionmaking, and the emphasis on strong central management,

reinforces social distance between teachers and administrators. This tends to reduce the effectiveness of *status* incentives by militating against efforts to provide teachers with special recognition, and reduces the effectiveness of *affiliation* incentives by denying to both teachers and principals a feeling of cooperation in pursuit of shared goals. The bureaucratic structure also emphasizes uniformity and regularity of educational practice and discourages deviations from the main stream. This tends to reduce opportunities to escape from *routine*, diminishes the motive power of *status* incentives by discouraging the assignment of status on the basis of merit or special effort, and similarly affects perceived opportunities to pursue *beliefs* and exercise *influence* over educational outcomes, by discouraging independence of effort. By denying to teachers and principals important opportunities to participate actively in decisions affecting their professional lives, it reinforces feelings of passivity, which reduce the strength of *fate control* as an incentive, and violates important *beliefs* in the morality and efficiency of participative decisionmaking.

H23. The absence of middle management or mixed teacher/administrator roles reduces the potential force of *influence* and *challenge* incentives by maintaining operational constraints on successful principals and teachers who wish to enlarge their success beyond the single school or classroom. These constraints also limit opportunities to pursue deeply held *beliefs* by restricting the scope of potential individual authority, and diminish the power of *role demand* incentives by maintaining social role distance between teachers and administrators, which contributes to role consensus problems.

H24. The failure to train or support selected teachers and principals on the basis of merit reduces the motive force of *status* incentives by denying recognition to potential leaders, and weakens *understanding* incentives by failing to identify and support opinion leaders who could provide subjective support to their colleagues in their search for feelings of cognitive consistency.

H25. The recruitment of administrators from among male teachers who do not have an arts and sciences background diminishes the effectiveness of *role demand*, *status*, and *fate control* incentives by creating an administrative cadre whose life style values, educational priorities and sex role perceptions may be at odds with those of many teachers, leading to role consensus problems, administrator indifference to teacher status, and directive rather than consultative management styles, which contributes to teacher feelings of passivity and dependence.

Incentives and Educational Technology

We have noted the following characteristics of educational technology (defined here to include knowledge):

- Uncertainty about the consequences of different educational methods.
- Poor techniques for measuring outcomes.
- Inadequate techniques for transmitting knowledge or personal expertise to education practitioners.
- Uncertain criteria for the recognition of practitioner excellence.
- Inadequate operational specificity for most innovations.

The relationship of these characteristics of technology to incentives in education is quite complex. Each aspect of technology has some impact on virtually every incentive we have discussed; each also interacts with and reinforces all other aspects in complex ways, and these interactions taken together have additional consequences for incentives to implement innovations. For example, debates over uncertain criteria for the recognition of practitioner excellence must take into account the inadequacy of techniques for measuring outcomes, since "product quality," if that could be measured, might constitute an objective criterion for measuring teacher skill. These debates are made more complicated when the importance of methodological uncertainty is also considered, since even where outcomes can be estimated it is hard to know whether they are the direct consequence

of excellent teaching technique or accounted for largely by non-school (or noninstructional) factors. All of these technological problems therefore have consequences for attempts to award *status* based on merit.

To take another example, methodological uncertainties have negative consequences for *understanding* and *influence* incentives, and may also diminish the effectiveness of *challenge* incentives by increasing the apparent difficulty of new methods. At the same time, these difficulties are complicated by the fact that techniques are inadequate for transmitting *existing* knowledge about educational methods, and by the low level of operational specificity for most proposed innovations--which is in turn a consequence, in part, of methodological uncertainties.

We are led by these considerations to propose the following hypotheses:

H26. Technological uncertainties and inadequacies in edcuation intersect with organizational and administrative characteristics that diminish the motive force of incentives to implement innovations, and further weaken those incentives.

H27. Where incentives are otherwise adequate to motivate efforts to implement innovations, technological uncertainties and inadequacies may largely account for practitioner unwillingness or hesitancy to proceed, and may become the single most important barrier to change.

H28. Because technological uncertainties and inadequacies are both potentially critical to implementation behavior, and extremely difficult to resolve in the short run, the need to reduce or eliminate organizational and administrative barriers to powerful incentives is more salient and pressing than it would be were technological problems largely resolved.

Incentives and the Educational Market

As Section II of this paper brings out, the effects of the market structure of education are for the most part second order in nature--they largely affect implementation incentives through their

impact on educational organization and administration. We have noted two characteristics of the educational market that affect these incentives in this way:

- o The public schools are a de facto local monopoly.
- o In important respects, the organization of education more nearly resembles a large manufacturing industry than a decentralized profession.

The hypotheses that follow are straightforward:

H29. The public monopoly characteristic of the education market reduces administrative incentives to offer improved or differentiated *material rewards*, because there is little need to make special efforts to attract outstanding staff, since the provision of such staff is not related to the ability to attract students.

H30. The "industry" as opposed to "profession" character of the organization of education militates against the consideration of individual differences among teachers or principals, which reduces proclivities to provide *status* based on the recognition of individual merit.

Incentives to Implement Innovations: Conclusions

The analysis and hypotheses presented above suggest that present organizational and administrative arrangements in education do not do a good job of providing incentives that will tap teacher and principal motivations to take risks in order to implement important innovations. These arrangements are in part a consequence of market/political forces in education, but are also independent of these forces in many ways. Their negative impact on incentives is complicated by technological uncertainties that are unlikely to be resolved in the short run.

We conclude that incremental or marginal changes in product use or educational process may have low impact on educational outcomes, while attempts at nonincremental, significant change may have slim chance for success due to the impact on incentives of present organizational and administrative arrangements. *Reforms aimed at*

altering these arrangements might eventually help to create an incentive structure more conducive to risk-taking behavior on behalf of companion innovations. At the same time, it is clear that attempts at reform will have to pay attention to the systemic, interactive, and mutually reinforcing nature of organizational, administrative, technological, and market/political variables in education, and that piecemeal reform efforts may be inadequate. It would be unwise to push on one part of the system without also considering how other parts will thereby be affected, and it will be difficult to effect reforms in one area without taking account of related problems that must be dealt with if reform attempts are not to be subverted by the "weight of standard practice."

These conclusions, if correct, are not in themselves an adequate argument for the significant alteration of current practices. In the first place, we should reemphasize that not all schools or districts resemble the "worst case" model we have employed here as a convenience to the analysis. Many are attempting important steps to change the patterns we have described, and their efforts must be assessed as policy directions are debated. In addition, care must be taken to examine the consequences of significant change for objectives besides that of maximizing incentives to implement innovations. These objectives might include, for example:

- Cost and efficiency improvements (e.g., large-scale planning and purchasing; transportation economies).
- Political/social considerations (teachers' unions, parent-community group views).
- Societal goals (socialization of youth, predictability and uniformity of educational outcome).
- Management control (minimizing disruptive student behavior, accountability).

The present system is not entirely a consequence of historical accident and large market forces; it has also grown in response to clear and obvious needs. But present arrangements probably reflect bureaucratic requirements for administrative convenience more than the direct needs of students and teachers.

IV. INCENTIVES TO ADOPT AND IMPLEMENT INNOVATIONS: RESEARCH AND EXPERIMENTS

The research proposed here is aimed at helping to respond to the two questions posed at the outset of this paper: What research should be conducted to test hypotheses about incentives for adoption? What research should be conducted to test hypotheses about individual incentives for implementation?

Research to Test Hypotheses About Incentives to Adopt Innovations

Most of the hypotheses advanced in Section II of this paper are not subject to test by experiment in the strict sense, since requisite "experimental" and "control" groups of schools do not exist in the absence of comparable private or voucher school systems. Three research avenues suggest themselves. The first is simply to analyze "natural" experiments--e.g., compare the behavior of public and private vocational schools; or to find out, as research on existing planned experiments (e.g., performance contracting or the voucher demonstration), whether there were significant differences in market behavior. A second avenue is entirely different. Instead of comparing private and public schools, it should be possible to examine the range of "economic" behavior found within the public school "industry," and to suggest explanations for why some school systems seem more willing than others to adopt certain kinds of innovations.

A third possible avenue of research would be to compare innovative behavior of public schools with either innovative behavior in other kinds of public institutions or in private noneducational firms. These approaches may be of less direct operational value for educational policymaking, but might nevertheless be of considerable research interest in the longer run.

The policy relevant issues are generally not about differences between schools' behavior and private firms' behavior, but about whether certain incentives are likely to encourage certain kinds of adoptions. Therefore the projects proposed below are only partly designed to test hypotheses comparing schools' behavior with private firms' behavior, and partly designed to test other issues about adoption.

Research to Test Hypotheses About Individual Incentives to Implement Innovations

Here again, many of the hypotheses suggested in Section III of this paper are not strictly subject to experimental testing. However, the scale of this universe is relatively manageable in research terms, since the concern with individual incentives to implement innovations largely focuses on the school, whereas the problems associated with adoption incentives and market or bureaucratic forces are system wide in nature. It should be possible, therefore, to mount various "experimental demonstrations" in order to test some of the hypotheses suggested in Section III, whereas this research strategy is not ordinarily feasible as an approach to the system/adoption problem. In addition, a variety of studies employing standard data gathering and analysis techniques should be possible, without the effort and expense of the special demonstration as a source of new information.

What follows is a brief outline of a number of projects of research and "experimentation" designed to test, elaborate, and refine many of the hypotheses advanced in Sections II and III of this paper. The projects are not restricted in size or scope but do represent a range of conceptual completeness in that some are more thoroughly worked out than others. The numbers in parenthesis after each project title refer to hypotheses that could be tested by that project. We have not attempted to force a "one-to-one" relationship between each hypothesis and a specific research project, and most projects are designed to yield information that would be pertinent to more than one hypothesis.

1. Cost Raising and Cost Reducing Innovations and Their Effects on Resource Mix (H1, H2, H3)

   Objective: To find out whether market-oriented schools are more likely than competitive firms to adopt cost-reducing innovations or those that lead to changes in the resource mix.

   Rationale: The profit motive may lead private schools to be more willing to adopt cost-saving innovations and less willing to adopt cost-increasing innovations than public schools. To

the extent that society has an interest in promoting efficiency in the educational system, the findings of such research might be of value in structuring, for example, policies governing federal aid to public education.

Approach: The most widespread form of private profit making school is the private vocational school. Private schools for general education are also numerous, but most of them are nonprofit. It might be possible to make two kinds of comparisons, using both kinds of private schools. Research should include the following comparisons: (1) For a given curriculum (e.g., training computer programmers, teaching French), develop information showing the range of instructional costs per pupil in profit-making, nonprofit, and public schools. (2) Categorize curriculum innovations by their typical level or range of per pupil costs, and find out whether there is any correlation between type of school and costliness of innovation, after adjusting for differences in some base period expenditure levels. (3) The same study could test the three types of schools' relative receptiveness to different resource-mixes in at least two ways. First the two types of private schools could be compared with appropriate public schools for current capital-labor ratios. Second, a survey could be taken of innovations adopted by each type of school, To see which type is more likely to adopt innovations that change the existing mix between capital and labor, and among different kinds of labor (e.g., professionals and paraprofessionals).

2. Receptiveness to Innovations Requiring Changes in Organizational Structure (H4, H5, H8)

Objective: To find out whether public schools are more or less likely than private schools to adopt innovations that require changes in their ways of doing business.

Rationale: The pressure of competition may require private firms to reorganize, change ways of doing business, or adapt structurally to changes in demand or supply conditions more readily than schools. While it is not clear that schools should emulate this greater flexibility, if it exists, there may be advantages to be gained by some incentives to encourage greater adaptability.

Approach: A series of case studies could examine how private and public schools have responded organizationally to major external or internal pressures (desegregation, decentralization, unionization, changes in level or type of demand for services, major changes in technology) in order to determine any systematic differences in response patterns. These results could be used as a basis for developing behavioral models of response to major stimuli in private and public education.

3. Relative Frequency and Type of Adoptions (H6, H7)

Objective: Private schools may adopt innovations in part from sales engineering motives, public schools in part for an analogous reason, to give the impression of change. It should be possible to find out to what extent different kinds of public schools, and different kinds of private schools tend to adopt: (1) larger or smaller numbers of innovations; (2) a high proportion of innovations that are primarily cosmetic.

Rationale: If certain types of schools consistently adopt relatively large numbers of innovations, it may be because they face special incentives to change or give the appearance of change. If public policy seeks to find the bases of innovative behavior, it seems important to examine innovative schools, to determine how much substance there is to the innovations that are adopted, to compare their structure and incentives with those of less innovative schools, and to see whether there are systematic differences among types of public schools, and between public schools and private schools.

Approach: For a sample of public and private schools, conduct surveys of innovations adopted over a period of three to five years. Classify innovations by degree to which they required changes in internal operations and degree to which they appear to have affected process or outcomes of schooling. This combination of quantitative and qualitative measurement could be used as a basis for assessing the extent to which different management and market conditions encourage different innovative strategies.

4. Effects of Educational Vouchers on the Adoption of Innovations (H6, H8, H9)

Objective: To find out whether a change in market structure affects adoption of innovations. This is a special case of research projects 2 and 3 above.

Rationale: The NIE voucher demonstration affords an opportunity to compare over the period 1972-1977 the innovative behavior of one school district faced with a change in market structure. The study should allow some judgments about the extent to which a particular change in market structure influences innovation.

Approach: First classify through interview methods the number and types of innovations introduced in Alum Rock schools that did adopt vouchers with those that did not. Second, compare number and types of pre-voucher innovations with post-voucher innovations. Third, find out whether there is any relation between type and number of innovations in each voucher project and demand for enrollment. This study should be longitudinal to see how the supply and demand for innovations develop over time.

A similar study could be conducted for other federally-supported programs that offer parent choice of schools (e.g., Berkeley and Minneapolis experimental schools projects).

5. New Economic Incentives (H1-H6, H21)

Objective: To create new individual and institutional rewards that will encourage desired behavioral change in support of innovation.

Rationale: Rewards to teachers and administrators are not directly conditioned on outcomes, except to the extent that recognition or esteem is parceled out, somewhat unsystematically. If rewards, such as salaries, sabbatic leave, special funding of project activities in return for successful performance, more freedom of action in use of funds, are more closely related to successful performance, then school staff may be more willing to try out innovations that require behavioral changes.

Approach: This is far from a new idea, and several experiments have been conducted including the OEO-sponsored performance contracting experiment, the OE-sponsored experiment with direct performance-based rewards for teachers and parents, and the OEO/NIE educational voucher demonstration. None of these approaches have yet been tested over a sufficient period of time, and several significant variants remain to be explored. For example, performance contracting might be tried out through contracts between school districts and teacher groups over a longer period than the one-year OEO experiment. Additional trials with vouchers might include a public-private school model, or ones with different levels of compensatory payments and different degrees of regulation.

Open enrollment plans have so far not led to major shifts in school attendance patterns. However, with the current decline in elementary school enrollments, it might be possible to introduce a new form, open enrollment crossing district lines in a metropolitan area, with funding following the student. This would give districts some incentive to compete for students.

Another approach might be to offer teachers direct incentives based on performance. Incentives might range from productivity

differentials in salary to differentiated staffing, allowing for the possibility of promotion to master teacher. Or the incentive might be in the form of extra funding for special programs as those programs succeed in meeting specified goals. Such devices as these could be tied to the much-discussed accountability movement, so that relatively objective standards for student cognitive development could be established (see Barro, 1970).

Some of the projects discussed below, such as alternative schools, also have effects on market incentives, by setting up competition among schools for students. The higher education system now works this way, although it is limited by differences in students ability to pay, which are only partly compensated by the existence of scholarship funds. If, as has been suggested, each post-secondary student had command over his share of a youth endowment fund, to be spent over a lifetime for education or training, the resulting situation would resemble a post-secondary voucher effort, leading to interinstitutional competition for students.

6. Professional Shelter and Support (H7, H9, H24)

Objective: To determine whether the provision of special shelter against risks, unusual opportunities for professional advancement, and the encouragement of peer elites will strengthen the incentives of selected administrators to adopt and implement innovative programs.

Rationale: Potential innovators at the district level should be given opportunities to consider what changes are desirable, encouraged to institute these changes, and be protected from possible damage to their careers as a result of their decisions. The provision of special reinforcment and protection for such leaders could alter their decision calculus.

Approach:

a. Ascertain whether it is possible to identify potential innovators and educational leaders in local districts.

b. If such leaders can be identified, interview them in order to find out how receptive they are to the idea of special shelter and support, and to elicit their ideas about the way these could best be provided.

c. Identify a handful of such leaders from districts with widely varying characteristics, and engage them in an experimental year. They would be offered a residence at the NIE that would provide them with opportunity for thought, study, and writing, access to people in government agencies and the academic community, and visits to innovative and interesting educational programs throughout the country.

d. On the basis of the first year's experience together with observations of the behavior of these "resident fellows" after they have returned to executive positions in local school districts, determine whether or not a permanent program should be instituted at NIE in order to guarantee potential risk-takers shelter, support, and a transitional period in which they will be able to recharge, rethink the problems of educational change, and use the NIE as a springboard for securing more attractive professional positions.

7. Education for Decisionmakers in Risk Reduction Strategies (H7, H19, H26)

Objective: To develop techniques that will help school administrators understand how to predict and plan for a range of problems associated with the implementation of new programs.

Rationale: School administrators do not have strong incentives to attempt innovative programs because they live in a world of uncertainty where a change in behavior brings with it unknown risks. However, uncertainty can be less threatening if techniques are available for contingency

planning, providing the ability to lay out a spectrum of possible consequences and administrative responses that will reduce the risk of failure in most cases. Many administrators are prepared to take risks if they can calculate even roughly what the size and nature of the risk will be.

Approach: This project would have both passive and active elements. The passive element would include preparing written materials; in particular, a series of checklists for school administrators which review for them the factors they should take into account when introducing innovative programs. These checklists should highlight the various danger signals that should alert an administrator to potential difficulty. They should be accompanied by case studies of real examples. Such checklists and case studies could be developed from both existing material and new research. The active part of the project would consist of the creation of a simulation exercise as a training and teaching device for school administrators. The advantage of such an exercise would stem from the intense personal involvement it can produce, the fact that learning would occur through an active rather than a passive experience, and the fact that in a risk-free simulated environment participants would feel freer to explore and experiment than they are in the real world. Simulation would use the passive materials--the checklists and case studies--as a training device, and might use one or more of the case studies as simulation scenarios. If this approach is successful, the simulation exercise could be constructed so that it can be packaged for wide distribution and could be used without special training or the hiring of special personnel by local school districts. Simple, effective, do-it-yourself simulation packages are within the state of the art today.

Finally, the project must develop effective techniques for reinforcing simulation-learned behavior. They key weakness of management-training simulation strategies (of which this is a variant) is their failure to deal with the fact that the determination of

trainees to apply lessons learned during the simulation exercise is swiftly eroded by the practical problems and pressures of real life. The manager who brings a "new" problem-solving style back to an institution or organization that behaves in "old" ways soon finds his training useless. An effort must therefore be made to provide him with strategies for implementing his new behavior, and reinforcement for his continued efforts in that direction. Such strategies should be worked out with the participation of school administrators themselves, who are in the best position to understand the obstacles that are faced by anyone who tries to do something a "new way."

8. An Educational Leadership Academy (H19, H22, H23, H24)

Objective: The creation of a self-consciously elite cadre of school principals who will think of themselves as leaders with a responsibility to take risks on behalf of needed social change, and will act accordingly.

Rationale: This project is designed to test the boundaries of opportunity for change that exist within the present educational system. Much research indicates that school principals are in a position to be leaders for change, but often perceive themselves as caught in the web of a system which renders them powerless. Their incentives to introduce new programs are affected by their self-image, and they may be unwilling to test the limits of the system in which they operate. This project is designed to affect that self image, and to produce school principals who will conceive of themselves as "special"--as leaders whose responsibility it is to push the system or change it.

Approach: This would be an experimental project in which promising young school principals are identified, selected, and trained somewhat on the model of the Armed Forces Command and Staff College, or perhaps the Harvard Graduate School of Business Administration Advanced Management School. We understand that

experiments in this area have been undertaken with disappointing results. One of the problems may have been the reinforcement in these experiments of a form of elitism that served to insulate administrators from the views of parents and the community. We assume that any training program with such an outcome was on its face poorly conceived. As an experiment, this project could proceed in phases: first, an exploration of capabilities needed to identify the right school principals for this kind of training, and an elaboration of the criteria that would be used for their selection; second, the design of a training program at a level of effort that would remain low and experimental but would nevertheless be able to yield necessary information about the character and cost of a more comprehensive and permanent arrangement; finally, the selection of perhaps a half dozen school principals who would be brought to NIE for a summer of intensive training by the experimental unit. The ultimate objective would be the creation of a Federal Educational Leadership Academy which would train school principals from all over the country.

9. Models of Exemplary Innovative Programs (H9, H10, H11, H26, H27)

Objective: To strengthen the incentives of school administrators at all levels to implement innovative programs by providing highly detailed, clinical models of the process by which these innovations were successfully implemented elsewhere.

Rationale: School administrators rely heavily on personal communication with their colleagues in deciding whether to adopt innovative programs. At the same time they generally have inadequate opportunities to exchange information in this way with other administrators who have had personal experience with the implementation of a specific innovation of interest. Their uncertainties are not reduced by most literature describing innovations, since this literature is rarely very specific. These uncertainties could be reduced if, for a specific innovation, a detailed model of the implementation

process could be provided, with specific examples from the history of that process in other schools or districts. This model would provide a guide to hidden obstacles that are likely to be encountered in attempts to implement the innovation in question, and would elaborate the conditions under which various implementation strategies might have the greatest chance of success. Such a model would be clinical rather than engineering in nature. It would assume that no two cases are ever exactly enough alike to warrant detailed behavioral specifications for problem solving, and what is needed, therefore, is diagnosis by an expert of how to approach a specific problem, based on the expert's experience and understanding of similar problems. As a diagnostician, an expert would presumably begin at very general levels to compare the problem at hand with others of similar experience or study and would test successively refined hypotheses until he was satisfied that he had isolated the critical variables. Since clinical experts are not generally available to school districts, the product we have in mind should essentially be a "kit for self-diagnosis" suitable for use by available, intelligent, non-specialists (i.e., school principals and district administrative staff). Such a model would have to be fine-grained and detailed, and present a carefully structured guide to implementation which deals heavily with the details of the implementation *process* from the perspective of the school administrator's decision space.

Approach: The models we have in mind would essentially be case studies of successful innovations and their implementation, at a heretofore unprecedented level of detail, especially with regard to implementation processes. The work would begin with arm-chair studies laying out the range and level of detail that would have to be addressed by the models, and would proceed to intensive field investigations of the history of the implementation of specific innovations at a number of sites. On the basis of these investigations, a detailed, heavily anecdotal handbook for the school administrator would be created, designed to give him concrete guidance as well as a list of human resources (other school

principals or administrators) to whom he could turn. The anecdotal quality is required in order to address the problem from the perspective of the school administrator rather than that of the educational researcher. The model will help to reduce uncertainty only insofar as it treats the administrator's problem from the perspective of his colleagues and in the language of his colleagues.

10. The Development and Use of Group Problem-Solving Techniques (H9, H19, H22, H24)

Objective: To develop in-school training programs to help teachers apply techniques of cooperation, information sharing and group problem solving.

Rationale: Research indicates that one of the obstacles to the implementation of innovative programs is the widespread feeling on the part of teachers that a substantial change in their behavior has uncertain consequences that will leave them isolated from their colleagues and vulnerable to the disapproval of their peers in the event of failure. The safe course thus appears to be a continuation of practices which, if not "optimum" from the point of view of producing desired outcomes, are at least predictable. Numerous studies, on the other hand, have pointed out that any innovation of significance implies the requirement for a change in roles, role structures, and behavior on the part of users. The development and use of group problem-solving techniques at the school level could provide necessary information sharing and important peer reinforcement for teachers who might otherwise be unwilling to risk any behavioral change.

Approach: The most promising approach to group problem-solving techniques appears to be some variant of "organizational development" strategies. This study might proceed in two stages. The first phase would be an investigation (probably through case studies) of the uses, risks, and benefits of OD in various school situations, particularly in situations involving attempts to

implement innovations (if these can be found). The second phase of the work would be the experimental use of organizational development strategies of different kinds with innovations which at the same time are being implemented without the use of such techniques in similar schools, thereby setting up an "experimental" and "control" situation for assessing the utility of these techniques. The final product could include training program for school principals which prepared them to use these techniques in their own schools, so that special resources for hiring outside consultants were not required. Alternatively, districts might be encouraged to develop and maintain a permanent staff capability in this area which could serve as a source of expert guidance and reinforcement for principals who would not be expected to develop a level of professional expertise in organizational development equal to that of specialists in the field.

11. Interactive Closed Circuit Television for Teachers (H10, H13, H15, H20, H26, H27)

Objective: To provide for teachers in a given school the capability to interact both with specialists in the R&D community and with their colleagues in other schools in problem-solving efforts aimed at reducing the uncertainties attached to efforts to implement specific innovations.

Rationale: The suggested use of organizational development strategies was aimed at providing a means whereby teachers could cooperate in solving problems of mutual interest and create strong peer reinforcement for innovative behavior. This project is designed to use state-of-the-art technology in order to put teachers in touch with a wider world of information and peer reinforcement. An interactive mode for cable television can provide the means for teachers at different schools to communicate without having to meet at some central location. In addition, it can put teachers in touch with members of the R&D community who rarely are in direct contact with user groups. The project would test the thesis that while

incentives to innovate are often present, the absence of practical and specific advice on implementation techniques is responsible for many failures. Research indicates that the typical process by which innovations are attempted is a "top-down" or "outside-in" procedure in which the R&D community lectures or delivers a "package" to practitioners, on the assumption that they will then know how to proceed. This model has generally been unsuccessful, apparently due in part to serious uncertainty among user groups about the specific role changes that are required. Group interaction with colleagues in their own schools will be helpful, but teachers may also need to interact with a wider world of information and a broader peer group, especially the teachers who have had some experience in attempting to implement the innovations considered.

Approach: The design of this project could be relatively straightforward. After choosing a specific innovation, cable television capabilities could be placed in the target school(s) and in schools where the innovation had already been attempted either successfully or unsuccessfully. Interactive terminals would also be placed at the offices of the originators and designers of the innovation and perhaps in the offices of implementation specialists who work with the school district. Here again it is assumed that a set of "control" schools might also be selected, and the innovations tried in these schools without the use of cable television. The history of efforts in both experimental and control schools would then be recorded in detail by participant observers and a preliminary assessment could be made of how useful this technology is for information sharing and for helping to achieve social change.

12. Building Cooperation Between the Practitioner and R&D Communities (H10, H15, H22, H26, H27)

Objective: To provide a means whereby potential users of an educational innovation can participate in its development and the development of strategies for its implementation.

Rationale: Research indicates that while there is often general agreement among teachers on the desirability of the goals that are associated with an innovation, the innovation is not implemented successfully because users, particularly teachers and students, are unable to work out the operational implications of the required changes in behavior. The research and development community has consistently failed to involve practitioners at the classroom or school building level in the development of innovative curricula or techniques, and in the development of strategies for the implementation of innovations. But the perspective of the user may be quite different from the olympian perspective of the developer. The experienced teacher knows that ideas that look good on paper or in the laboratory are often unusable in the classroom. It has been objected that the perspective of any given teacher is likely to be idiosyncratic, whereas the developer of an innovation must take into account a broader range of environments and behaviors. It is also commonly objected that the teacher as a non-expert is in no position to understand the research rationale behind the development of a specific innovation. These objections *may* be correct, but we know of no systematic efforts to test them. It could be argued to the contrary, for example, that it is precisely the non-expert's view that is important, since it is the same non-expert who will have to use the innovation in question. There should be ample opportunity for the possibly idiosyncratic views of a given teacher or set of teachers to be tested against the views of their colleagues in real life situations as attempts are made to implement an innovation in actual schools

Approach: The simplest approach to this problem might be to place selected teachers and administrators with the R&D community at the predevelopment and development stages of a proposed innovation. This might work; however, there is also some risk in this approach in that the lay person in such a situation might feel diffident about expressing his or her views and could

end up being largely ignored as "window dressing" by the "experts." An alternative would be an attempt to institutionalize this procedure in reverse. In this case regular meetings agreed upon in advance with specific structures and agendas would be set up between the members of the R&D community working on an innovation and selected teachers, at different stages of the development process. At these meetings (which could be held on "psychologically neutral" territory) the developers would present their ideas and their strategies to the users and the users would have an opportunity to provide feedback and criticism. The trouble with this alternative is that the required interinstitutional contact would be more irregular and formal. We think both approaches should be attempted and an assessment made of their relative utility.

13. Large Scale Alternative Schools (H16-H28)

Objective: To build and maintain a school that would alter the organizational, bureaucratic and technological environments for existing incentives.

Rationale: Many school administrators and teachers operate within the constraints of a traditional school environment that has not changed appreciably for many years. Their perceptions of opportunities to change, their assessments of uncertainties and risks, and their motivations to try different approaches are all severely bounded by the structural opportunities and limitations that are built into the everyday world of their school. These limitations include the largely inescapable requirement that instruction take place within an enclosed area holding approximately 30 students; that information is transmitted directly from a single adult to large groups of children; that the scope, contents and format of the curriculum are largely preordained; that the pace of curriculum presentation is, for the most part, lockstep; that the role of adults is to run the school and the role of the children is to be students, with no intermingling of these roles. Opportunities for change are bounded by these

and similar considerations. The boundaries are physical but they are also boundaries of time and role. Existing patterns of personal interaction, reinforced by the existing use of physical space and curriculum materials, constrain the way in which time is used, constrain freedom of motion and movement, and bound the role perceptions of all participants. If we wish to induce educators (and students) to develop new incentives, then we might try to remove or alter these constraints, at least experimentally. Such projects would be self-consciously "high-risk--high payoff" although appropriate contingency plans could and should be incorporated into the design of such schools in order to minimize potential losses (e.g., schools could be designed for eventual use either as traditional schools or as buildings with different functions). In a high-risk program the prospective cost of failure may be greater, but the prospective benefits of success are also increased. This possibility is of particular importance because a limited, circumscribed program has to produce sizeable educational benefits, not just a statistically significant difference, before it can serve as a practical basis for pervasive change. The efficacy of a low risk incremental strategy would be quite low where the objective is to change the perspectives, the risk calculus, and the incentive structures of practitioners.

Approach: The design of alternative schools can proceed in stages. Preliminary designs can be funded at low risk and low cost and can be made to pass strict criteria of logic, of support for programmatic and operational specifications in the research literature, and of design and cost feasibility before more detailed design efforts are funded. In this way even preliminary designs which do not pass such tests may yield a bonus in creative thinking and interesting ideas. The alternative school(s) should be thought of as eventually self-sustaining institutions, though there may be relatively high one-time development and implementation costs. But a truly alternative school cannot be designed, developed, implemented and run

without the prior understanding that it shall have a long experimental life. Thus the typical demand that an innovation show "results" within a year after its implementation is begun would be unrealistic and self-defeating. It should be understood that some designs would require several years for complete design and implementation, and several more years for an operational test of their feasibility. One example of a preliminary design that may satisfy most of these criteria is "A New School For The Cities," in *Education and Urban Society*, Vol. 3, No. 2, February 1971. Other designs of this scope may also exist, or could presumably be initiated.

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